

H.A

Notice of Allowability

Application No.

10/813,784

Examiner

Hsien-ming Lee

Applicant(s)

HUANG, CHIEN-CHAO

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 5/24/2006.
2. ☒ The allowed claim(s) is/are 1-7, 9-18, 20-25, 27-35, 37-41 and 43-48.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

HSIEN-MING LEE
 PRIMARY EXAMINER

5/30/06

DETAILED ACTION

Remarks

1. The objection and rejections, as set forth in the final rejection, have been withdrawn in response to applicant's amendment filed 5/24/2006.
2. Applicant's cancellation to claims 8, 19, 26, 36 and 42 is acknowledged. Claims 1-7, 9-18, 20-25, 27-35, 37-41 and 43-48 are pending in the application.

Examiner's Amendment

3. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Randy W. Tung (Reg. No. 31,311) on May 30, 2006.

4. The application has been amended as follows:

In claim 1, at line 11 (i.e. in e step), **replace** "said AlCu portion" **with** -- said portion of said AlCu layer --.

In claim 9, at line 1, **replace** "method 8" **with** -- method 1 --.

In claim 10, at line 1, **replace** "method 8" **with** -- method 1 --.

In claim 15, at line 2, **replace** "pressures" **with** -- pressure --.

In claim 22, at line 3, **replace** "PMD" **with** -- pre-metal dielectric --.

Allowable Subject Matter

5. Claims 1-7, 9-18, 20-25, 27-35, 37-41 and 43-48 are allowed.

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6. The following is an examiner's statement of reasons for allowance:

In re claim 1, the prior art of record, either alone or combination, does not teach or suggest forming a layer of *AlCu* filling a via opening in *closed communication* with a *conductive portion*, wherein the conductive portion comprises *silicide electrical contact areas comprising a CMOS transistor* portion selected from the group consisting of a gate electrode and source and drain regions; and carry out process steps c) and d) at a temperature of *less than about 400 degrees Centigrade*.

In re claim 13, the prior art of record, either alone or combination, does not teach or suggest that a conductive portion comprises *salicide electrical contact areas comprising a CMOS transistor* portion; forming a layer of *AlCu* at a temperature *less than 400 °C* to fill a via opening to form an *AlCu* via; and forming an *AlCu interconnect line from the portion of the AlCu layer*.

In re claim 24, the prior art of record, either alone or combination, does not teach or suggest that an *AlCu* via comprises a first barrier layer formed in a dielectric insulating layer in closed with communication with a conductive portion, wherein the conductive portion selected from the group consisting of tungsten, metal silicide, copper and *AlCu*; and a *second barrier layer encapsulates an AlCu interconnect line on three sides*.

In re claim 35, the prior art of record, either alone or combination, does not teach or suggest that an *AlCu via comprises a barrier layer* lining in an *AlCu* via opening, the via opening formed in a dielectric insulating layer in *closed with communication with a conductive portion*; and structure portions b is stacked *sequentially* in overlying dielectric layers to comprises at least *three* metallization layers.

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7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hsien-ming Lee whose telephone number is 571-272-1863. The examiner can normally be reached on Tuesday-Thursday (7:30 ~ 6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Hsien-ming Lee
Primary Examiner
Art Unit 2823

May 30, 2006

HSIEN-MING LEE
PRIMARY EXAMINER

Lee
5/30/06